

Summary of the experimental GIC service provided by Solar Shield

Solar Shield real-time GIC forecasts are composed of two different levels: Level 2 (Fig. 1) forecasts providing lead-time of 30-60 minutes and Level 1 (Fig. 2) forecasts providing lead-time of 1-2 days. Note that the text files depicted in Figs. 1 and 2 are samples of actual output from the forecasting system.

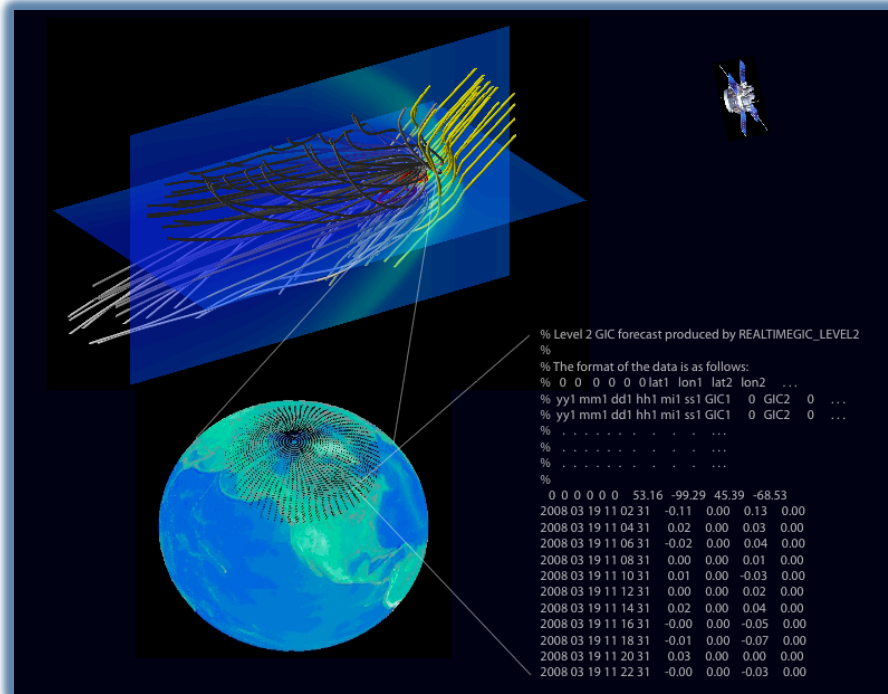


Fig. 1. The process used to generate Level 2 GIC forecasts. Lagrange 1 point solar wind observations carried out by ACE are used to drive global magnetospheric MHD model. The ionospheric current output of the MHD model is used to compute GIC at individual power transmission system nodes. The final output of the system is given as a text file, which is provided to EPRI for integration to the SUNBURST decision support tool. The MHD, ionospheric current and GIC data shown in the figure are from an actual model run.

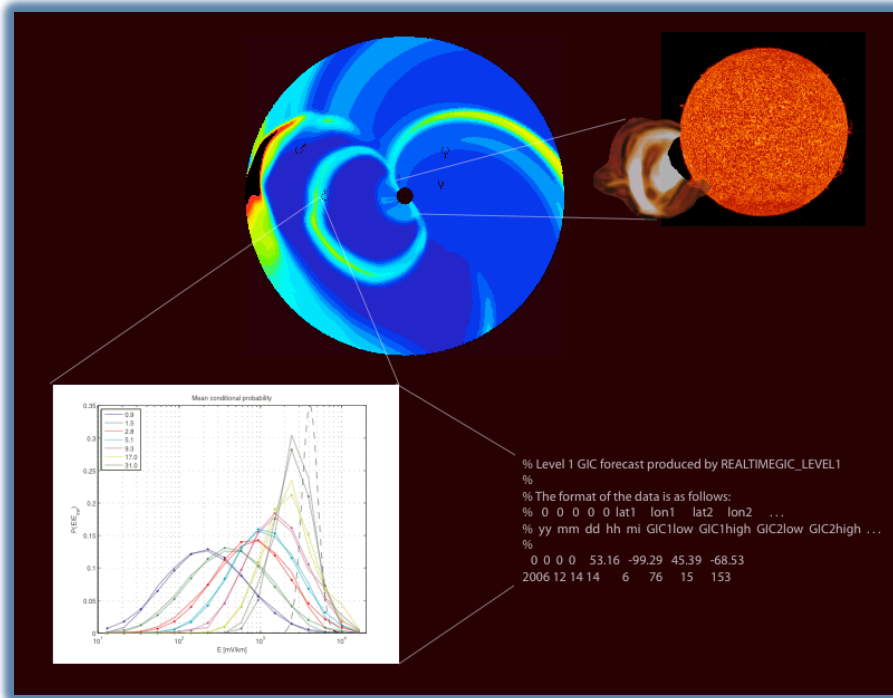


Fig. 2. The process used to generate Level 1 GIC forecasts. Solar observations (LASCO instrument onboard the SOHO spacecraft) of CMEs are used to initiate a transient disturbance at the inner boundary of a heliospheric MHD model that propagates the CME to the Earth. The modeled MHD parameters at the Earth are used in a statistical model coupling solar wind bulk properties to GIC at individual power transmission system nodes. The final output of the system is given as a text file, which is provided to EPRI for integration to the SUNBURST decision support tool. The CME, heliospheric MHD and GIC shown in the figure are real LASCO, ENLIL heliospheric MHD model (ecliptic view) and Level 1 forecast data. Note, however, that the image of the Sun is not produced by LASCO but by EIT instrument also onboard SOHO.